

ABSTRACT OF THE DISCLOSURE

A method of treatment of reactant fluids such as hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs), hydrochlorocarbons (HCCs), and hydrocarbons (HCs) for the production of new chemical fluids. Another method of treatment for the transformation of the reactant fluids having impurities present in the chlorofluorocarbons (CFCs) or fluorocarbons (FCs) for yielding a high quality chemical product. Reactant fluids with impurities present in used CFC or FC may form an azeotropic mixture. A photochemical reaction is used wherein the reactant fluids are molecules with hydrogen atoms in a hydrogen-carbon bond. The process is comprised of the following steps:

5 placing the reactant fluids into a process compartment of the photochemical reactor;

10 placing halogen fluid or oxygen fluid into the process compartment of the photochemical reactor, wherein the halogen fluid is selected from a group consisting of chlorine (Cl_2), bromine (Br_2) and iodine (I_2); and irradiating the fluids and the halogen or oxygen fluid using radiant energy from lamps operating in the visible and ultraviolet light regions of

15 the electromagnetic spectrum to conduct thermolysis, photolysis and photochemical treatment by halogenating or oxidizing the molecules of the reactant fluids with the halogen or oxygen fluids to form halogenated or oxidized fluids during a dwell time period.